UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,438	02/10/2004	Lawrence C. Gunn III	LUX-P021	2909

7590 02/02/2006

Fernandez & Associates, LLP
PO Box D
Menlo Park, CA 94026-6402

EXAMINER	
BLEVINS, JERRY M	
ART UNIT	**PAPER NUMBER**
2883	

DATE MAILED: 02/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/776,438	GUNN ET AL.	
	Examiner	Art Unit	
	Jerry Martin Blevins	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-99* is/are pending in the application.

4a) Of the above claim(s) *1-17,26,27,38-40 and 51-99* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-25,28-37 and 41-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/26/04,3/03/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Claims 1-17, 26, 27, 38-40, and 51-99 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions (claims 26, 27, and 51-72), to a nonelected species (claims 1-17, 38-40, and 74-85), and to a nonelected subspecies (claims 73 and 86-99), there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 01/04/2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 18-20 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent to Myers et al., number 5,473,721.

Regarding claim 18, Myers teaches an integrated optical apparatus (Figure 6) comprising: a planar waveguide on a substrate (column 5, lines 40-52); the waveguide having an elongate guiding portion (Figure 6) and a grating coupler (110); the grating coupler comprising a plurality of gratings having respective scatter-cross-sections adapted to scatter light along a portion of a predetermined optical path (Figure 6 and column 5, lines 40-52) and a gas-filled cavity (column 5, lines 40-52), at least a portion

of which is in the substrate; the cavity positioned with respect to the gratings such that light scattered outside the portion of the optical path is reflected by the cavity towards the gratings (column 5, lines 40-52).

Regarding claim 19, Myers teaches that the grating coupler includes sidewalls to confine the light in a transverse direction (column 4, line 47 – column 5, line 12).

Regarding claim 20, Myers teaches that the grating coupler comprises a channel waveguide (column 2, lines 13-29).

Regarding claim 24, Myers teaches that the gas-filled cavity is filled with air (column 5, lines 40-52).

Claim 28 is rejected under 35 U.S.C. 102(b) as being anticipated by US Patent to Friesem et al., number 6,215,928.

Regarding claim 28, Friesem teaches an integrated optical apparatus (Figure 2) comprising: a planar waveguide (22) having an elongated guiding portion and a grating coupler (24); the grating coupler comprising: (a) a plurality of gratings having a respective scatter-cross-sections adapted to scatter light along at least a portion of a predetermined optical path (Figure 2 and column 4, lines 24-34), (b) a cladding (26) on the plurality of gratings; and (c) an anti-reflection coating (28) on the cladding for reducing reflections.

Claims 37 and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent to Welch et al., number RE37,354.

Regarding claim 37, Welch teaches an integrated optical apparatus (Figure 9), comprising: a planar waveguide (112) having an elongate guiding portion and a grating coupler (119), the coupler having a flared waveguide portion (114) comprising a relatively narrow end portion and a relatively wide end portion (Figure 9), the flared portion having a grating (119) positioned to couple light between the coupler and an optical element (column 10, lines 7-26 teach that the apparatus couples light without specifying an optical element, but an optical element would necessarily exist in order for the apparatus to couple light), wherein the grating comprises curved elongate scattering elements having curvatures defined by substantially elliptical paths (Figure 9) so as to couple plane waves between the waveguide grating coupler and the optical element.

Regarding claim 45, Welch teaches a cladding over the grating and an anti-reflection coating over the cladding for reducing reflections (column 9, line 46 – column 10, line 6).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Myers in view of US Pre Grant Publication to Haronian, number 2003/0108274.

Regarding claims 21-23, Myers teaches the limitations of the base claim 18. Myers does not teach that the substrate comprises a silicon wafer with a silicon dioxide layer and one or more layers of material formed on the silicon wafer. Haronian teaches a waveguide on a substrate wherein the substrate comprises a silicon wafer with a silicon dioxide layer and one or more layers of material formed on the silicon wafer (Figure 22 and page 9, paragraph 108). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the substrate of Myers with the substrate of Haronian. The motivation would have been to protect the waveguide (page 9, paragraph 108).

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Myers in view of US Patent to Borak et al., number 6,003,340.

Regarding claim 25, Myers teaches the limitations of the base claim 18. Myers does not teach that the waveguide comprises cladding wherein the gas-filled cavity is in at least a portion of the cladding. Borak teaches a waveguide with a cladding, wherein a cavity extends in at least a portion of the cladding (column 4, lines 23-49). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the waveguide and cavity of Myers with the waveguide and cavity of Borak, wherein the cavity extends in at least a portion of the waveguide cladding. The motivation would have been to improve the coupling between the waveguide grating coupler and the cavity.

Claims 29-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friesem in view of US Patent to Snavely et al., number 4,173,778.

Regarding claims 29-31, Friesem teaches the limitations of the base claim 28. Friesem does not teach that the coating comprises a multilayer, quarter-wave stack, wherein the stack comprises multiple layers of relatively high and low index material having thicknesses selected to provide reduced reflection for light of a predetermined wavelength incident on the coating at a predetermined angle. Snavely teaches an anti-reflection coating comprises a multilayer, quarter-wave stack, wherein the stack comprises multiple layers of relatively high and low index material having thicknesses selected to provide reduced reflection for light of a predetermined wavelength incident on the coating at a predetermined angle (column 10, line 26 – column 14, line 38). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the coating of Friesem with the coating of Snavely. The motivation would have been to improve the reduction of reflection at desired wavelengths.

Regarding claim 32, Friesem in view of Snavely teaches the limitations of the base claim 31. Friesem also teaches an optical element (Figure 1, laser 10) oriented with respect to the grating coupler (12, seen in greater detail in Figure 2) so as to provide an optical path directed at the predetermined angle with respect to the grating coupler, the grating coupler coupling light between the planar waveguide and the optical element (column 3, line 26 – column 4, line 34).

Regarding claims 33-36, Friesem teaches the limitations of the base claim 28. Friesem does not teach that the coating comprises alternating layers of semiconductor

(silicon) and dielectric material selected from the group consisting of oxide and nitride (which would necessitate multiple layers of dielectric material). Snavely teaches an anti-reflection coating comprising alternating layers of semiconductor (silicon) and dielectric material selected from the group consisting of oxide and nitride (column 6, lines 21-45). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the coating of Friesem with the coating of Snavely. The motivation would have been to improve the reduction of reflection at desired wavelengths.

Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Welch in view of Myers.

Regarding claims 41-43, Welch teaches the limitations of the base claim 37. Welch also teaches that the elongate scattering elements have respective scatter cross-sections adapted to scatter light along at least a portion of a predetermined path (column 10, lines 7-26). Welch does not teach a air-filled cavity positioned with respect to the grating such that light scattered outside the portion of the optical path is reflected by the cavity towards the grating, and a substrate, wherein the waveguide is disposed over the substrate and at least a portion of the cavity being in the substrate. Myers teaches an integrated optical apparatus (Figure 6) comprising: a planar waveguide on a substrate (column 5, lines 40-52); the waveguide having an elongate guiding portion (Figure 6) and a grating coupler (110); the grating coupler comprising a plurality of gratings having respective scatter-cross-sections adapted to scatter light along a portion

of a predetermined optical path (Figure 6 and column 5, lines 40-52) and a gas-filled cavity (column 5, lines 40-52), at least a portion of which is in the substrate; the cavity positioned with respect to the gratings such that light scattered outside the portion of the optical path is reflected by the cavity towards the gratings (column 5, lines 40-52). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Welch with the teaching s of Myers. The motivation would have been to improve coupling between the grating and the waveguide.

Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Welch in view of Myers as applied to claim 43 above, and further in view of Borak.
Regarding claim 44, Welch in view of Myers teaches the limitations of the base claim 43. Welch in view of Myers does not teach that the waveguide comprises cladding wherein the gas-filled cavity is in at least a portion of the cladding. Borak teaches a waveguide with a cladding, wherein a cavity extends in at least a portion of the cladding (column 4, lines 23-49). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the waveguide and cavity of Welch in view of Myers with the waveguide and cavity of Borak, wherein the cavity extends in at least a portion of the waveguide cladding. The motivation would have been to improve the coupling between the waveguide grating coupler and the cavity.

Claims 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Welch in view of Snavely.

Regarding claims 46-50, Welch teaches the limitations of the base claim 45. Welch does not teach that the coating comprises a multilayer stack of alternating layers of semiconductor (silicon) and dielectric material selected from the group consisting of silicon dioxide and silicon nitride (which would necessitate multiple layers of dielectric material). Snavely teaches an anti-reflection coating comprises a multilayer stack of alternating layers of semiconductor (silicon) and dielectric material selected from the group consisting of silicon dioxide and silicon nitride (column 6, lines 21-45). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the coating of Welch with the coating of Snavely. The motivation would have been to improve the reduction of reflection at desired wavelengths.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry Martin Blevins whose telephone number is 571-272-8581. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMB

Frank G. Font
Supervisory Patent Examiner
Technology Center 2800